

2021 Western Drought & Extreme Heat Assessment

Assessment Period: July 5-11, 2021

Publication Date: July 20, 2021

USDA NASS

Disaster Monitoring Team



Outline

- The attached slides provide an overview of the extreme heat and drought conditions in five NASS Regions: Northwest, Pacific, Mountain, Northern Plains, and Upper Midwest.
 - Slides 3-5 illustrate **temperature and precipitation anomalies** for the conterminous U.S. from July 1-18, 2021. This is based on PRISM Climate Group data and 30 years of climatological information.
 - Slides 6-11 illustrate areas impacted by **heat stress** for each region individually for Weeks 26 (June 28-July 4, 2021) & 27 (July 5-11, 2021) in 2021, Week 27 in 2020, and the Week 27 five-year average.
 - Slides 12-30 identify the resulting impact of the lack of precipitation and extreme heat on **cropland subsoil moisture**. Weekly average subsoil moisture, anomalies, and categorical levels for Week 27 (July 5-11, 2021) are illustrated. The information was obtained from the Crop-CASMA web application. Figures use a crop mask (gray) to block out non-cropland areas. An analysis was conducted to identify the percent of cropland at varying levels with extreme conditions highlighted.

PRISM Climate Group Data

- Offers an "early glimpse" version of precipitation and temperature data from the current month
- The datasets are modeled using climatologically-aided interpolation (CAI), which uses the long-term average pattern (i.e., the 30-year normals) as first-guess of the spatial pattern of climatic conditions for a given month or day
- Data supported by USDA RMA



Map provided by PRISM Climate Group: <https://prism.oregonstate.edu/mtd/>

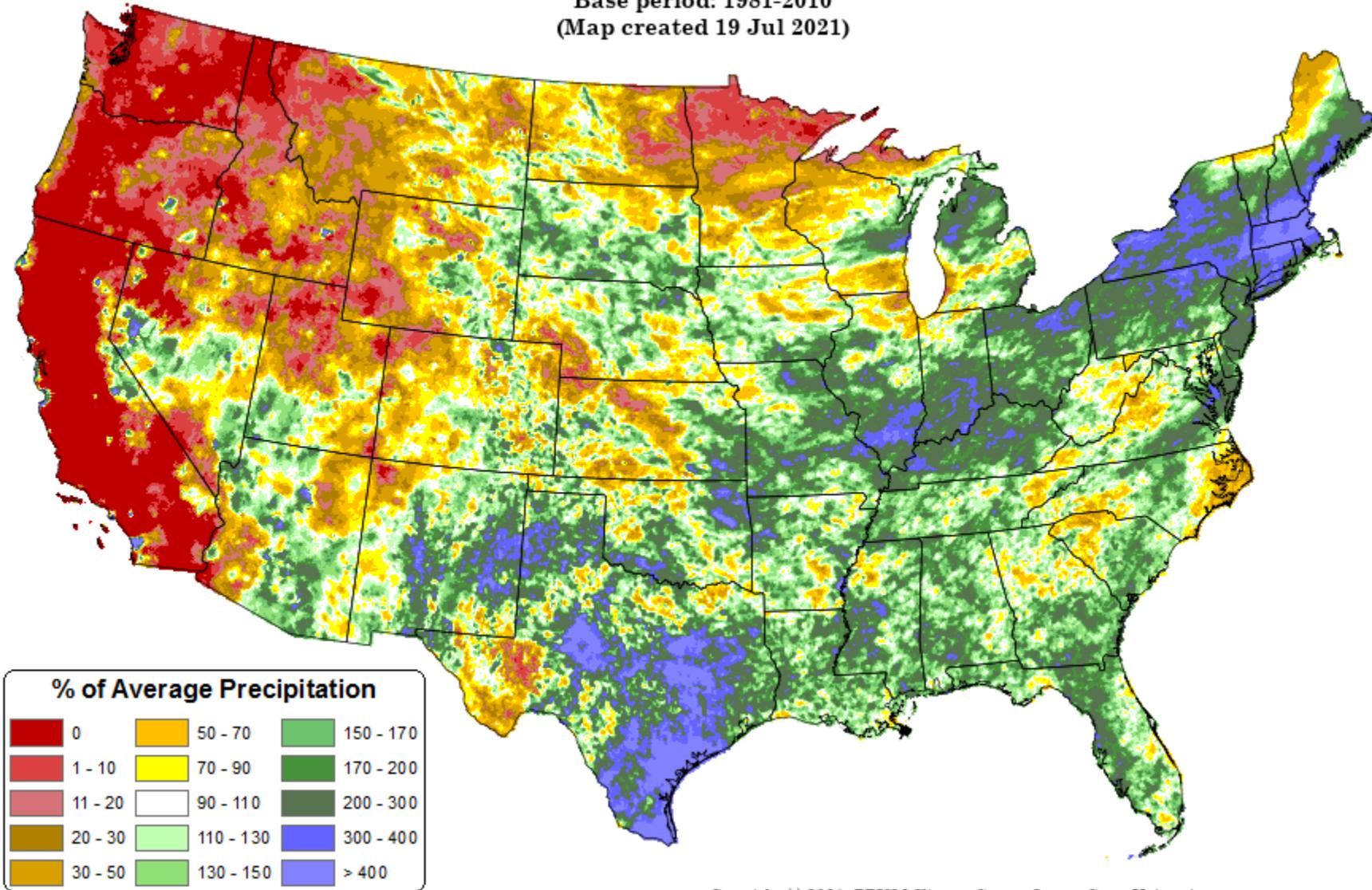


Total Precipitation Anomaly: 01 Jul 2021 - 18 Jul 2021

Period ending 7 AM EST 18 Jul 2021

Base period: 1981-2010

(Map created 19 Jul 2021)



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Map provided by PRISM Climate Group: <https://prism.oregonstate.edu/mtd/>

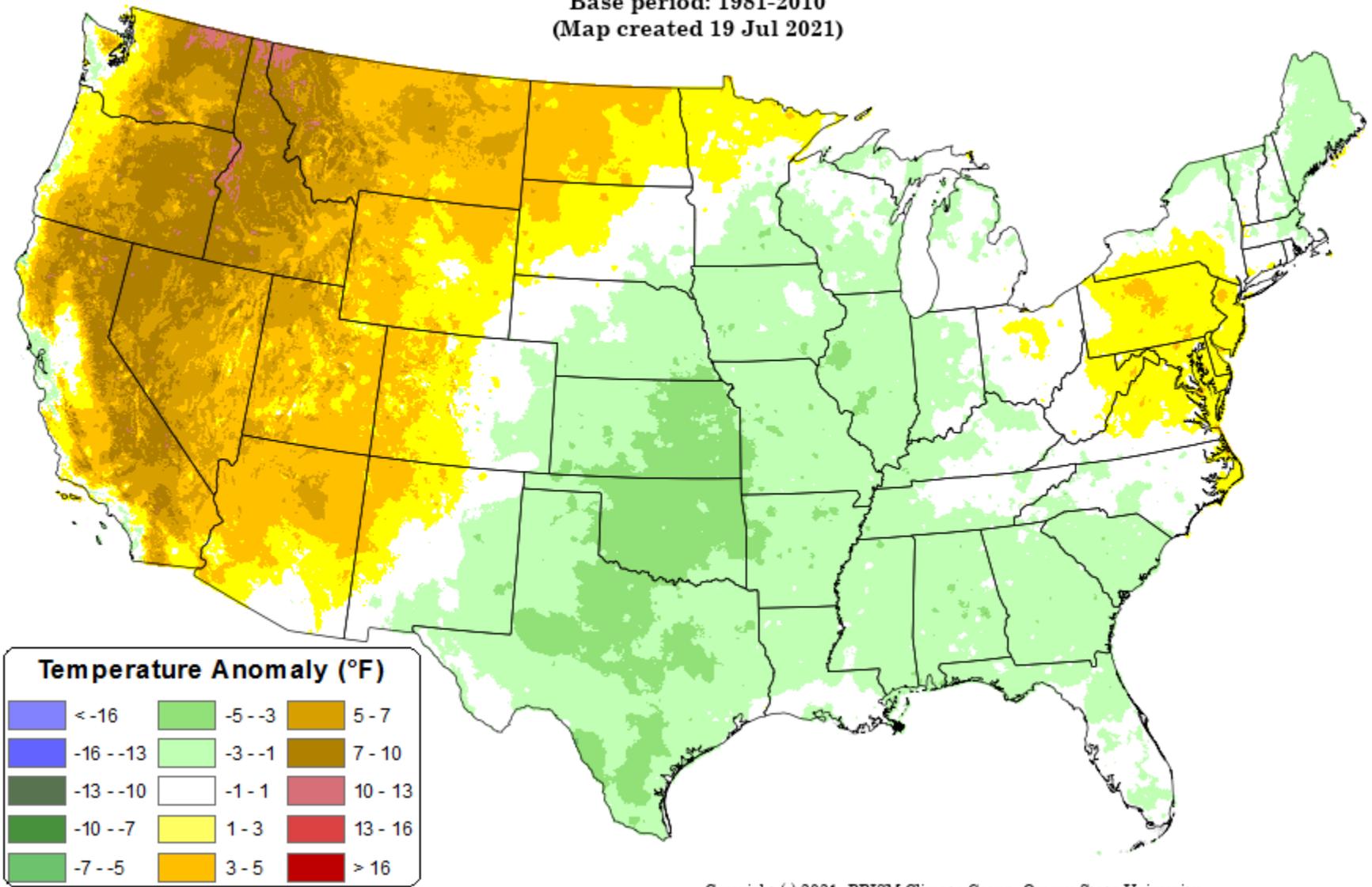


Daily Mean Temperature Anomaly: 01 Jul 2021 - 18 Jul 2021

Period ending 7 AM EST 18 Jul 2021

Base period: 1981-2010

(Map created 19 Jul 2021)



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Map provided by PRISM Climate Group: <https://prism.oregonstate.edu/mtd/>



Heat Stress Data

- Data calculated using data from two main sources of gridded products, PRISM, and RTMA.
- Heat stress is calculated as the difference between the maximum observed temperature during the day and the selected threshold (T_{dth}). If the maximum temperature is lower than T_{dth} , HSDD is equal to zero.

$$HSDD = (T_{max} - T_{dth})$$

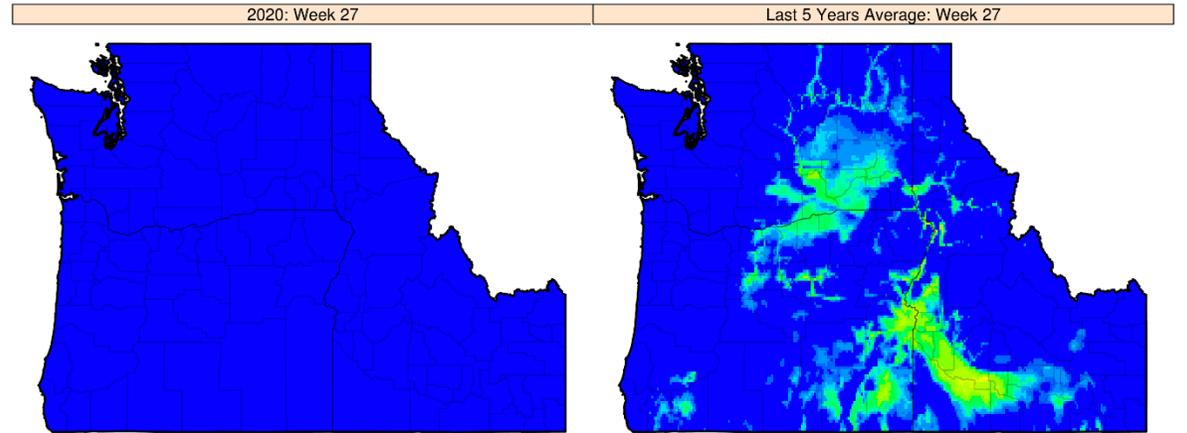
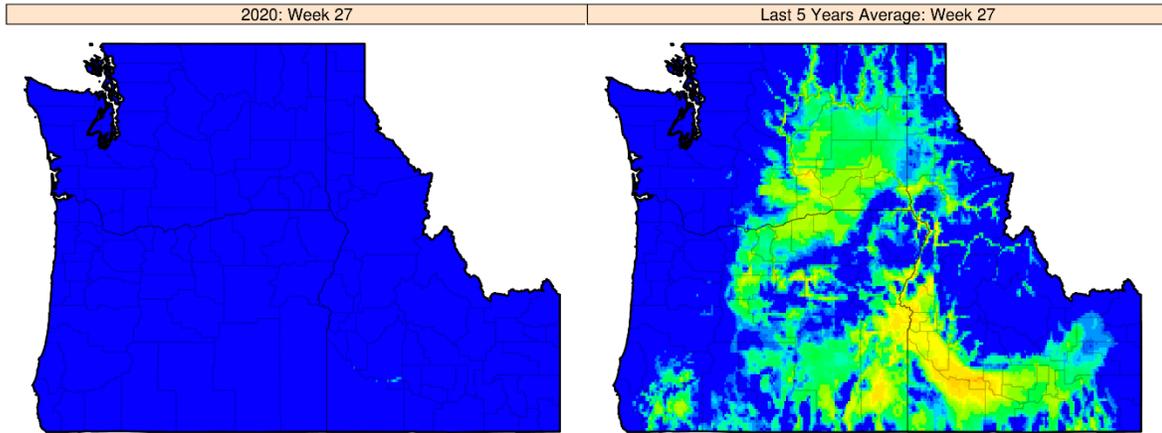
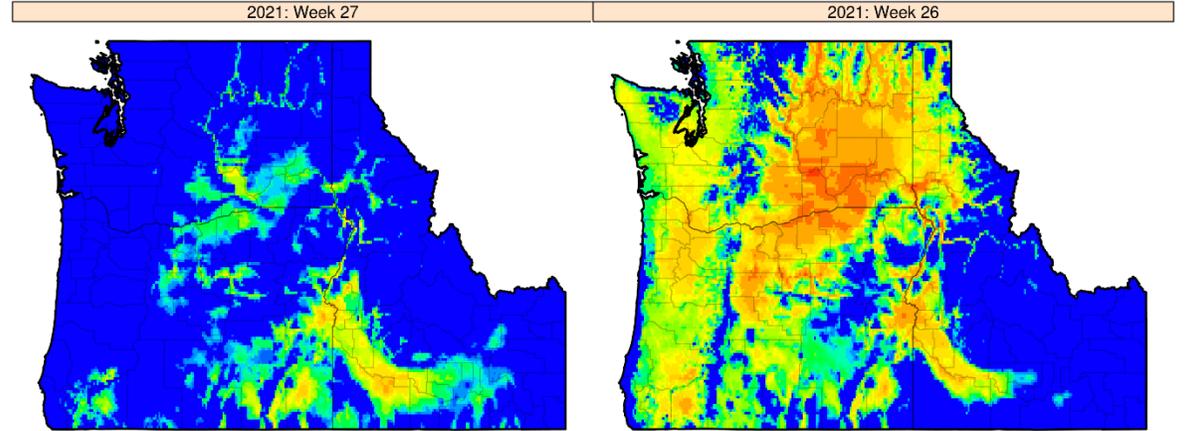
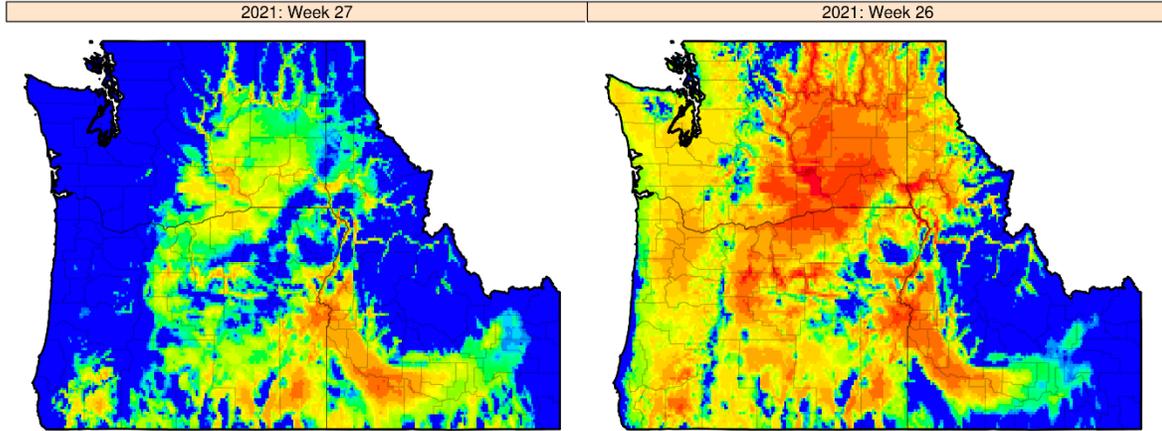


Source: NASS Climate-based Information System



Northwest Region - Heat Index (93°F) - 2021: Week 27
Accumulated Degrees above 93 Degrees

Northwest Region - Heat Index (97°F) - 2021: Week 27
Accumulated Degrees above 97 Degrees



*Does not include Alaska

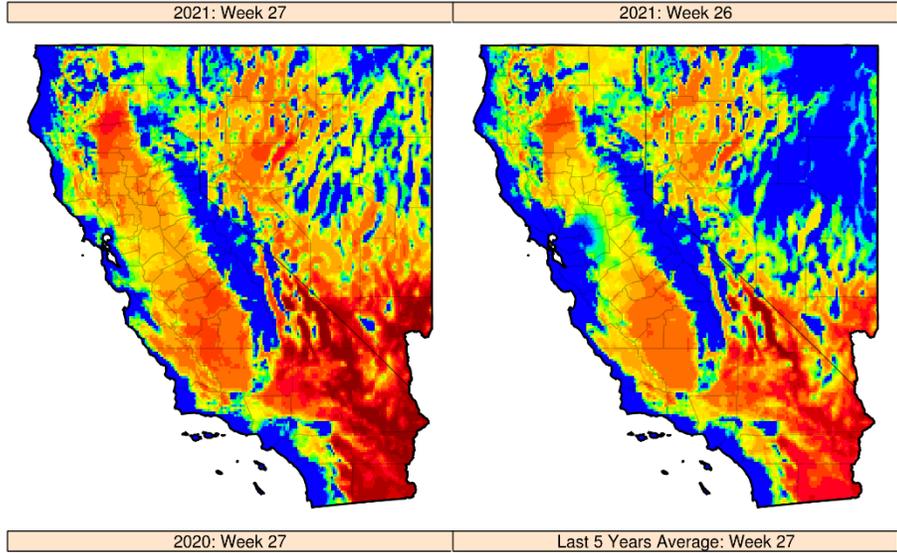
*Does not include Alaska



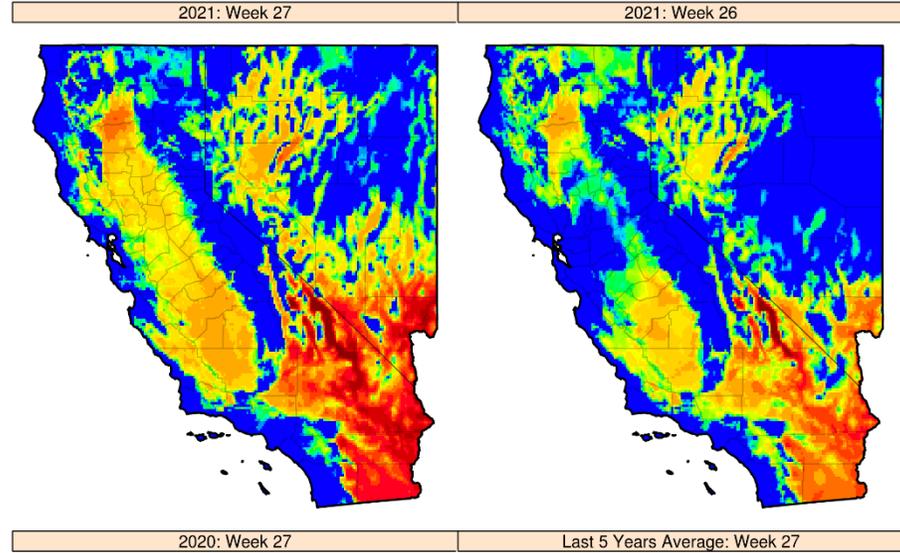
Source: NASS Climate-based Information System



Pacific Region - Heat Index (93°F) - 2021: Week 27
Accumulated Degrees above 93 Degrees



Pacific Region - Heat Index (97°F) - 2021: Week 27
Accumulated Degrees above 97 Degrees



*Does not include Hawaii



*Does not include Hawaii

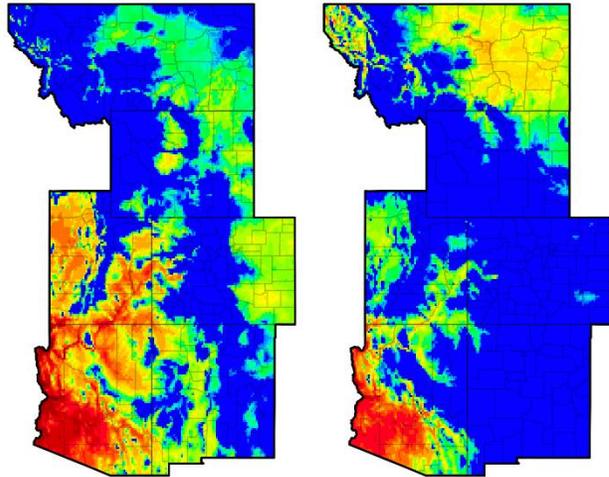


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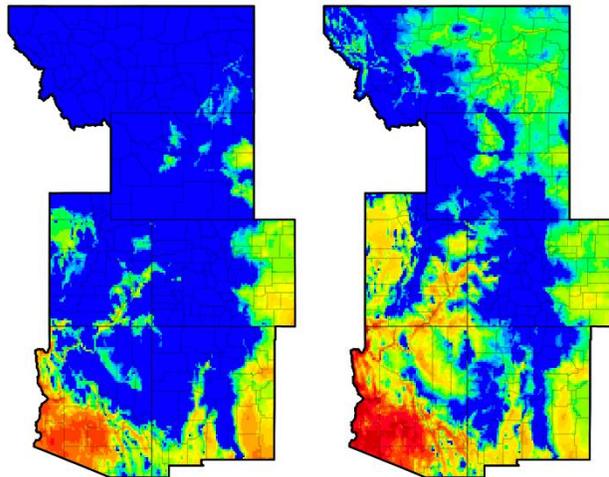


Mountain Region - Heat Index (93°F) - 2021: Week 27 Accumulated Degrees above 93 Degrees

2021: Week 27 2021: Week 26

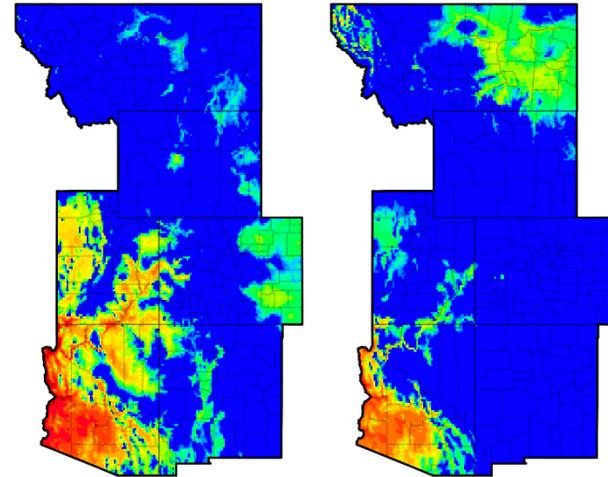


2020: Week 27 Last 5 Years Average: Week 27

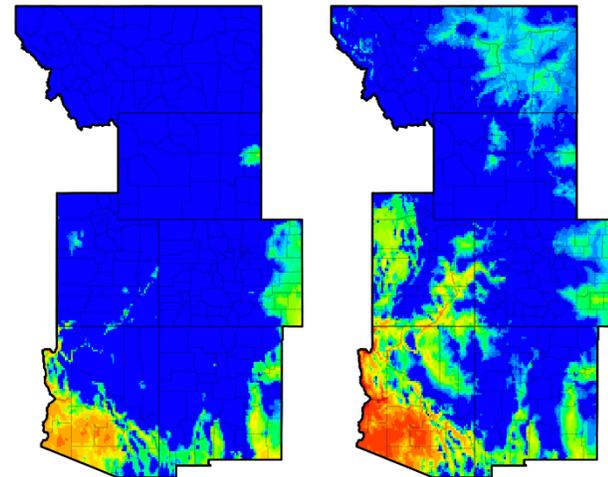


Mountain Region - Heat Index (97°F) - 2021: Week 27 Accumulated Degrees above 97 Degrees

2021: Week 27 2021: Week 26



2020: Week 27 Last 5 Years Average: Week 27

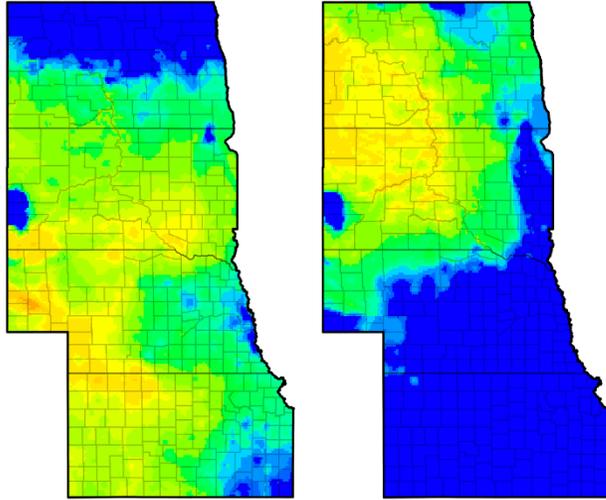


Source: NASS Climate-based Information System

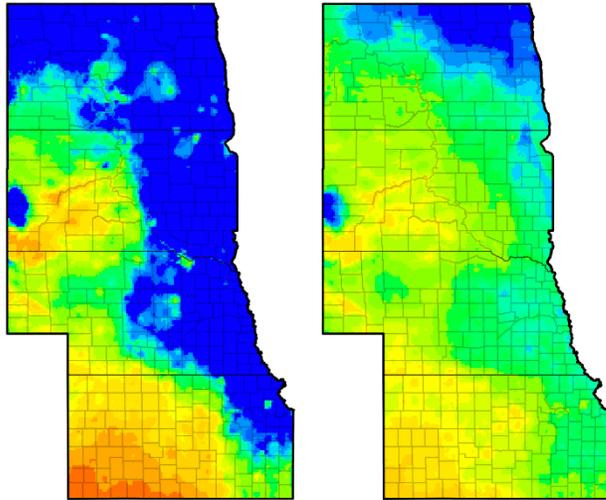


Northern Plains Region - Heat Index (90°F) - 2021: Week 27 Accumulated Degrees above 90 Degrees

2021: Week 27 2021: Week 26

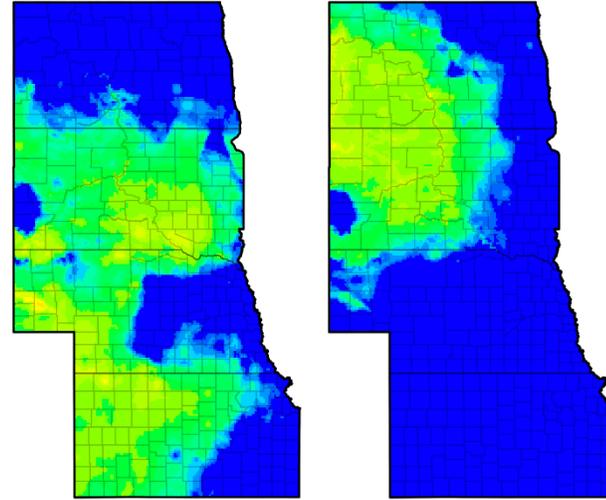


2020: Week 27 Last 5 Years Average: Week 27

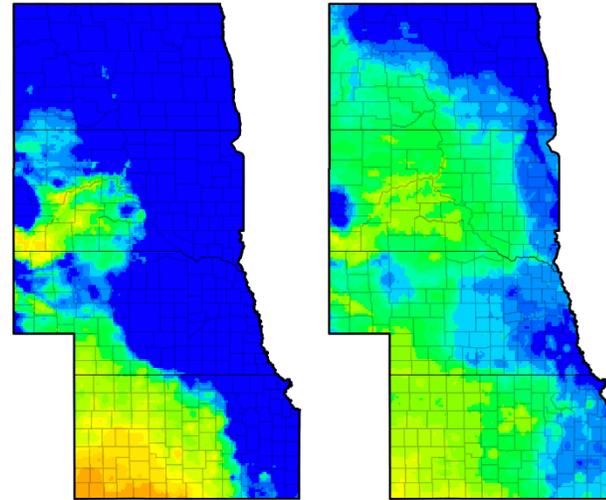


Northern Plains Region - Heat Index (93°F) - 2021: Week 27 Accumulated Degrees above 93 Degrees

2021: Week 27 2021: Week 26



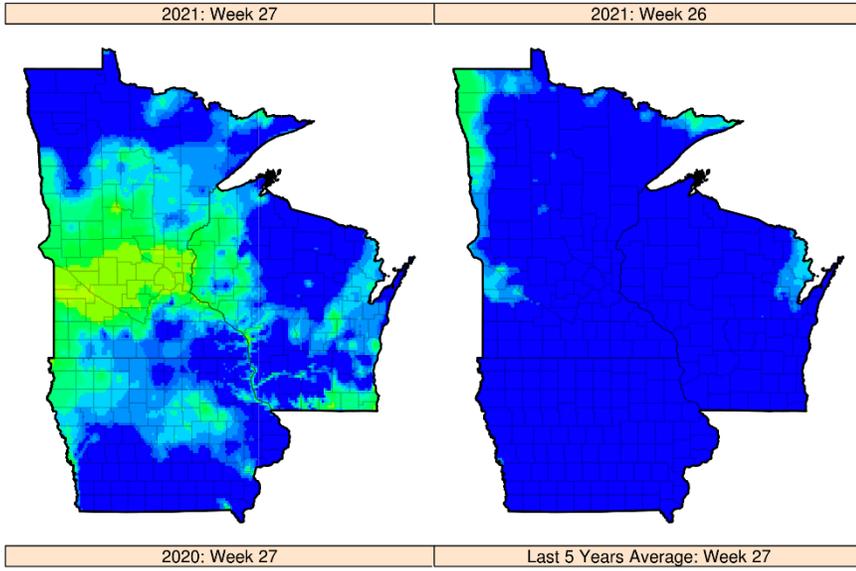
2020: Week 27 Last 5 Years Average: Week 27



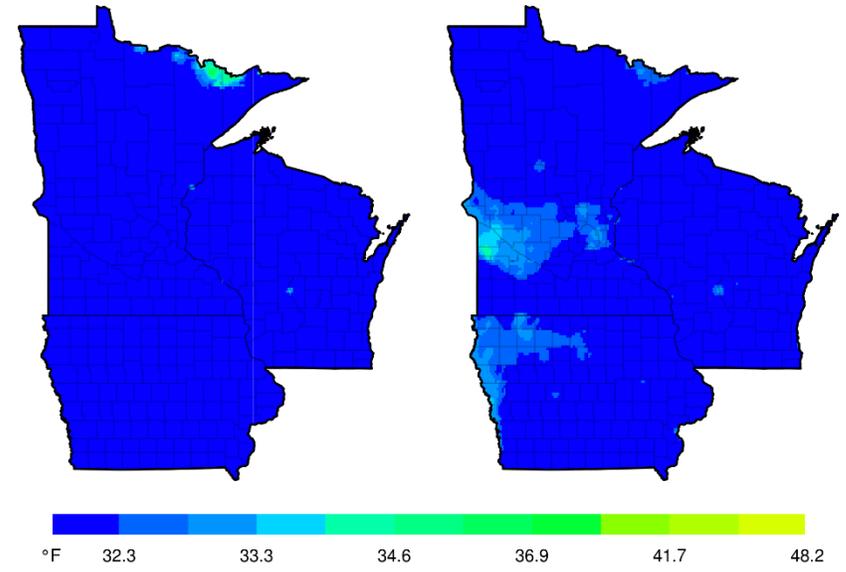
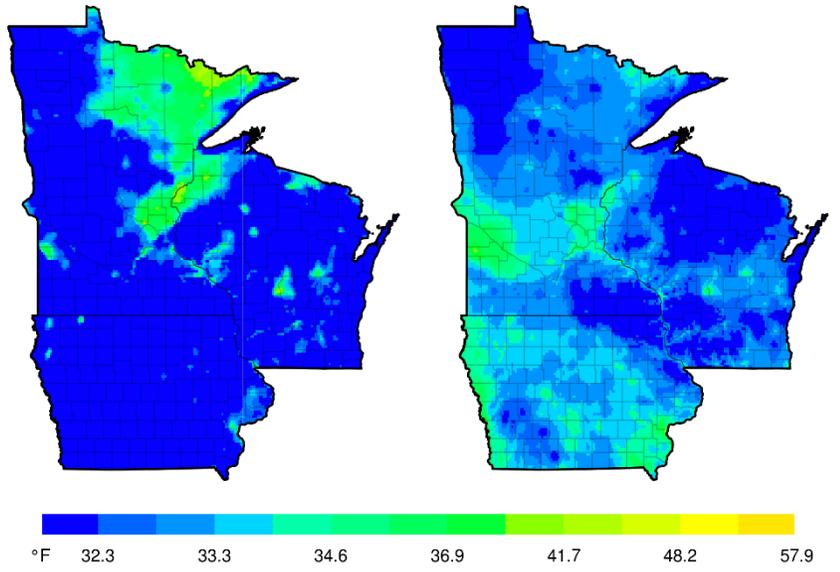
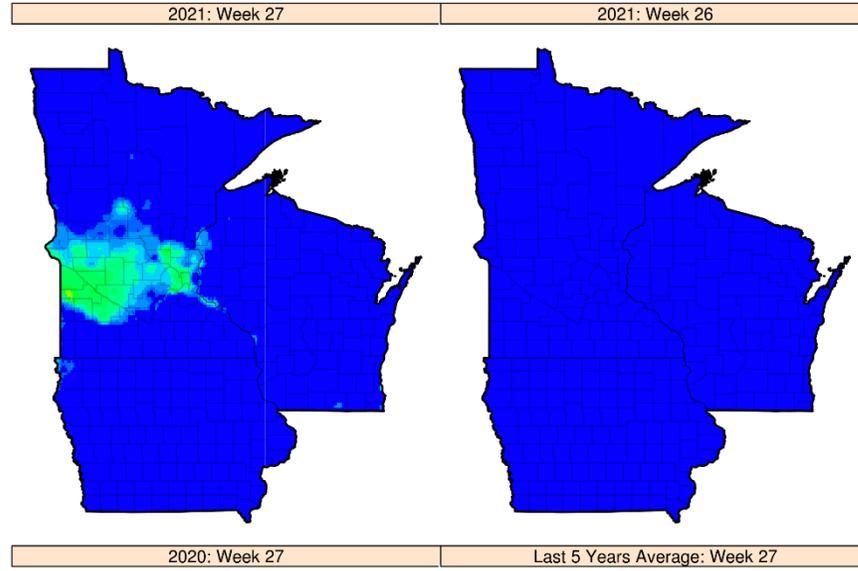
Source: NASS Climate-based Information System



Upper Midwest Region - Heat Index (90°F) - 2021: Week 27
Accumulated Degrees above 90 Degrees



Upper Midwest Region - Heat Index (93°F) - 2021: Week 27
Accumulated Degrees above 93 Degrees



Source: NASS Climate-based Information System



Soil Moisture Data

- Hosted by Crop-CASMA (Crop Condition and Soil Moisture Analytics) <https://nassgeo.csiss.gmu.edu/CropCASMA/>
- Data Used
 - Sub Soil Moisture, 9km, Weekly, Year 2021, Week 27, July 5-11, 2021
 - Sub Soil Moisture Anomaly, 9km, Weekly, Year 2021, Week 27, July 5-11, 2021
 - Sub Soil Moisture Categorical, 9km, Weekly, Year 2021, Week 27, July 5-11, 2021
- Total Cropland derived by 2020 Cultivated Layer hosted on Crop-CASMA.



Sub Soil Moisture

- NASA Remotely Sensed Rootzone Soil (sub soil) is defined as the top 3.2 feet (approximately 1 meter).
- The NASA SMAP (Soil Moisture Active Passive) 9km soil moisture measurements are volumetric soil moisture (i.e. volumetric water content in the soil). It is simply the ratio of water volume to soil volume.
- Sub soil moisture measuring at $0.1 \text{ cm}^3/\text{cm}^3$ and below (10% water content) could be considered very dry.



Sub Soil Moisture Anomaly

- The soil moisture anomaly (SMA) in CropCASMA is a measure of deviation of the current soil moisture value from the "normal" soil moisture level, which is represented by a historical average soil moisture value (from 2015 to current).
- The SMA of a given location is defined by the following formula:

$$SMA = \frac{SM - SM_m}{SM_m} \times 100\%$$

where SM and SM_m denote current soil moisture value and the historical average soil moisture value of a given location.

- Soil moisture anomaly below -40% could be considered very abnormal, which means there is 40% less soil moisture than normal conditions.



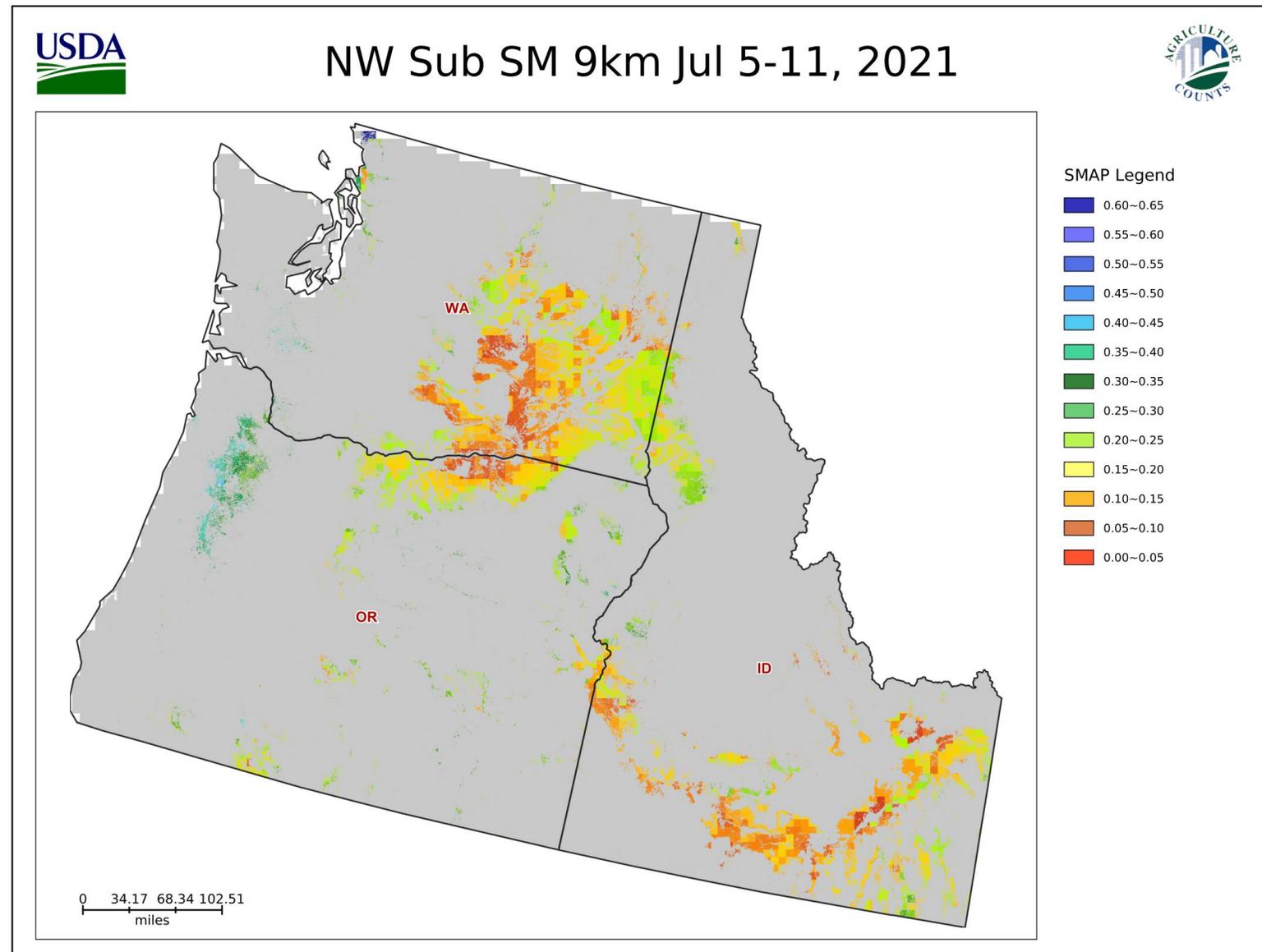
Sub Soil Moisture Categorical

- SMAP values are categorized into NASS categories which include:
 - Very Short - Soil moisture supplies are significantly less than what is required for normal plant development. Growth has been stopped or nearly so and plants are showing visible signs of moisture stress. Under these conditions, plants will quickly suffer irreparable damage.
 - Short - Soil dry. Seed germination and/or normal crop growth and development would be curtailed.
 - Adequate - Soil moist. Seed germination and/or crop growth and development would be normal or unhindered.
 - Surplus - Soil wet. Fields may be muddy and will generally be unable to absorb additional moisture. Young developing crops may be yellowing from excess moisture.



Northwest Region
Sub Soil Moisture 9km
July 5-11, 2021

Sub Soil Moisture (9km, July 5-11, 2021)				
Volumetric Soil Moisture (cm ³ /cm ³)	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland			
0.0-0.05	5.07%	4.93%	4.94%	5.31%
0.05-0.1	17.34%	18.15%	7.11%	21.45%
0.1-0.15	26.69%	33.98%	16.33%	25.71%
0.15-0.2	33.44%	28.23%	36.58%	36.27%
0.2-0.25	12.72%	13.76%	16.80%	9.61%
0.25-0.3	2.09%	0.95%	7.16%	0.70%
0.3-0.35	1.93%	0.00%	8.67%	0.40%
0.35-0.4	0.46%	0.00%	1.89%	0.17%
0.4-0.45	0.10%	0.00%	0.50%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%	0.00%
> 0.65	0.16%	0.00%	0.00%	0.37%
Total	100.00%	100.00%	100.00%	100.00%



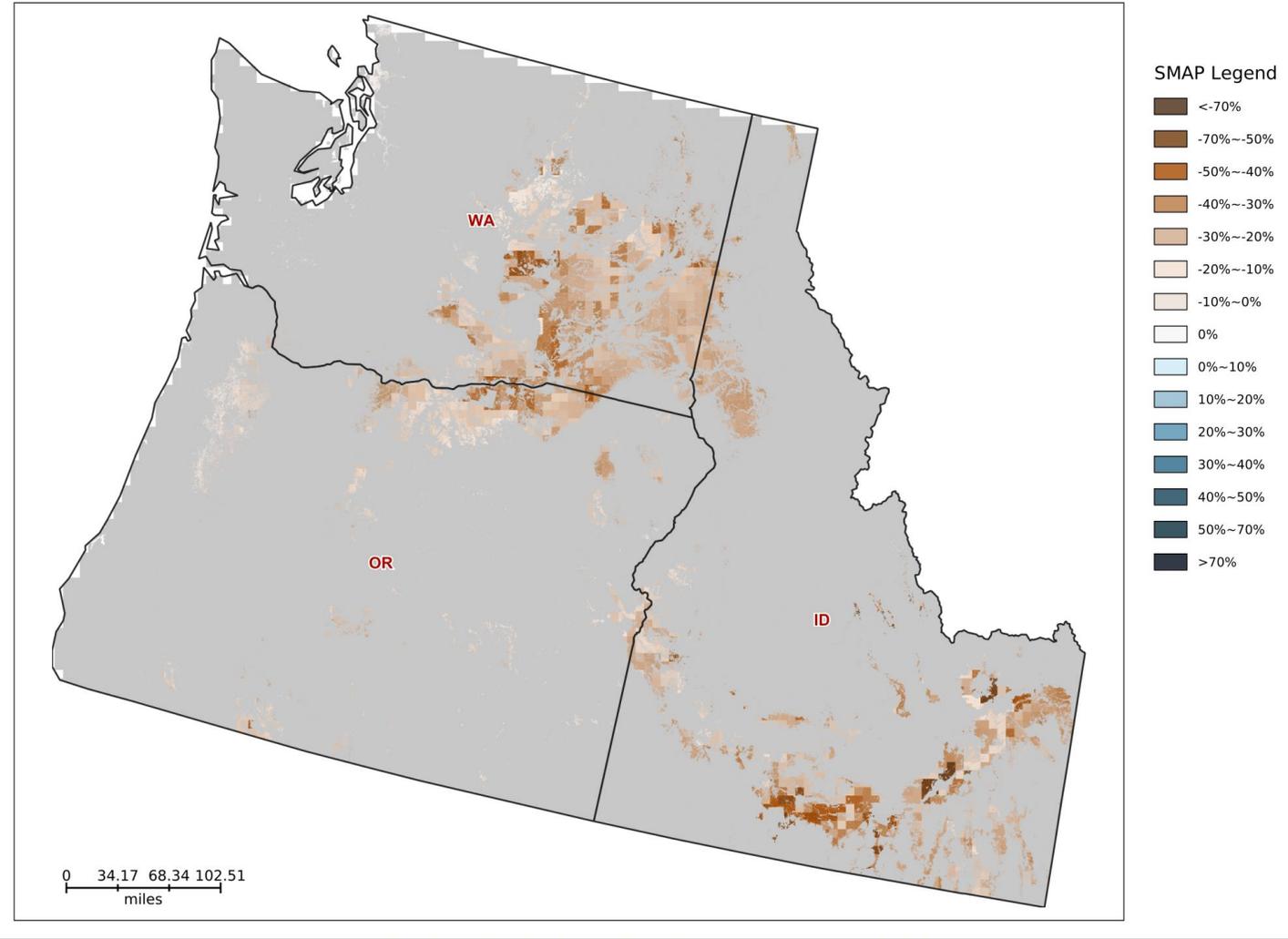
Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>

Northwest Region
 Sub Soil Moisture Anomaly 9km
 July 5-11, 2021

Sub Soil Moisture Anomaly (9km, July 5-11, 2021)				
Soil Moisture Anomaly	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland			
<-70%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.98%	2.73%	0.00%	0.00%
-50%~-40%	2.80%	5.06%	0.67%	1.98%
-40%~-30%	6.65%	8.48%	5.39%	5.76%
-30%~-20%	34.03%	45.60%	14.81%	33.27%
-20%~-10%	50.37%	36.97%	69.82%	52.31%
-10%~0%	5.18%	1.16%	9.31%	6.67%
0%~-10%	0.00%	0.00%	0.00%	0.01%
10%~20%	0.00%	0.00%	0.00%	0.00%
20%~30%	0.00%	0.00%	0.00%	0.00%
30%~40%	0.00%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%



NW Sub SM Anomaly 9km Jul 5-11, 2021



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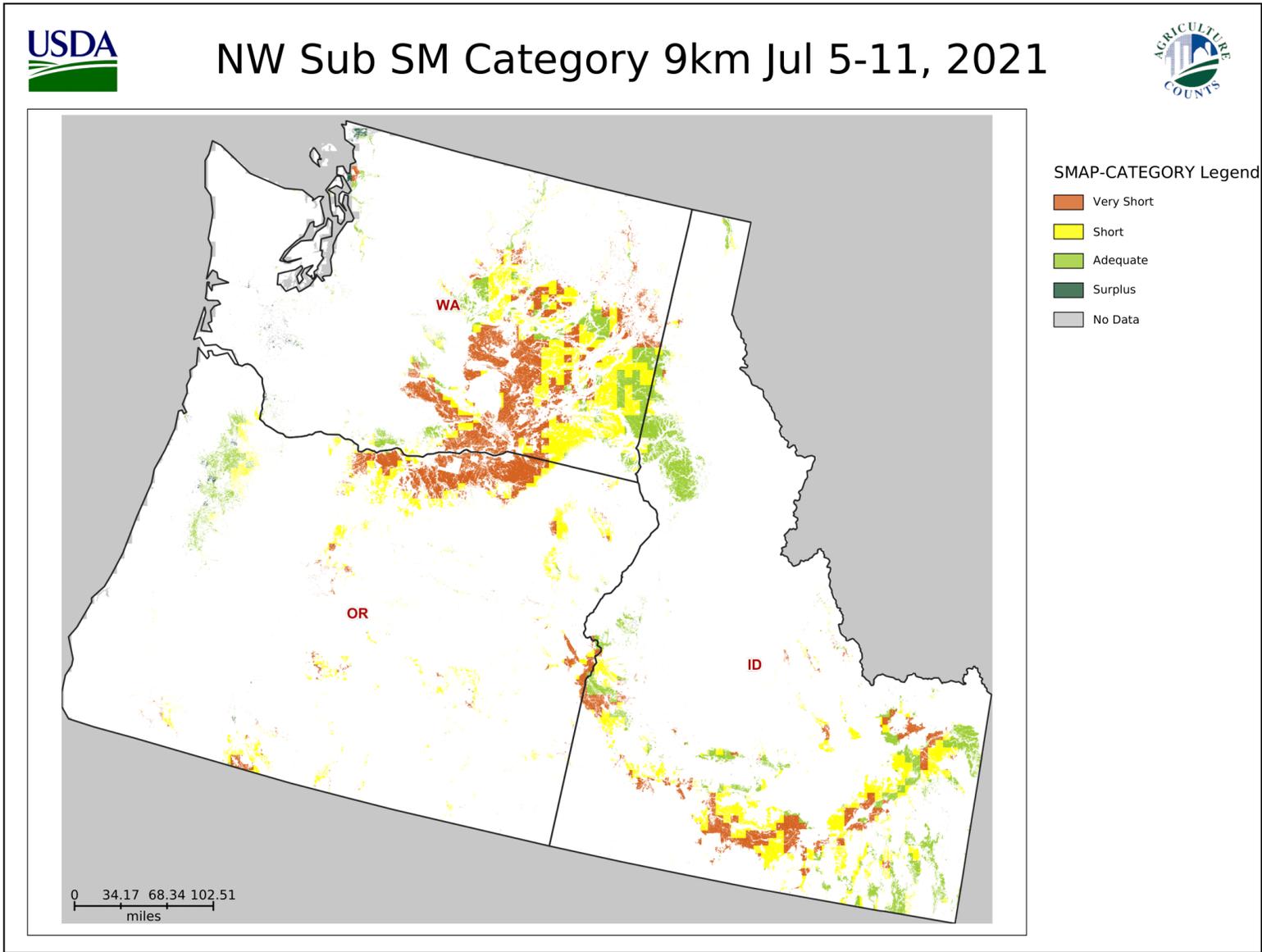


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Northwest Region
 Sub Soil Moisture Categorical 9km
 July 5-11, 2021

Sub Soil Moisture Categorical (9km, July 5-11, 2021)				
Categorical Soil Moisture	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland			
Very Short	36.48%	23.49%	49.99%	41.11%
Short	37.62%	36.82%	38.38%	38.20%
Adequate	25.12%	39.67%	10.90%	19.25%
Surplus	0.57%	0.03%	0.73%	0.96%
No Data	0.21%	0.00%	0.00%	0.48%
Total	100.00%	100.00%	100.00%	100.00%



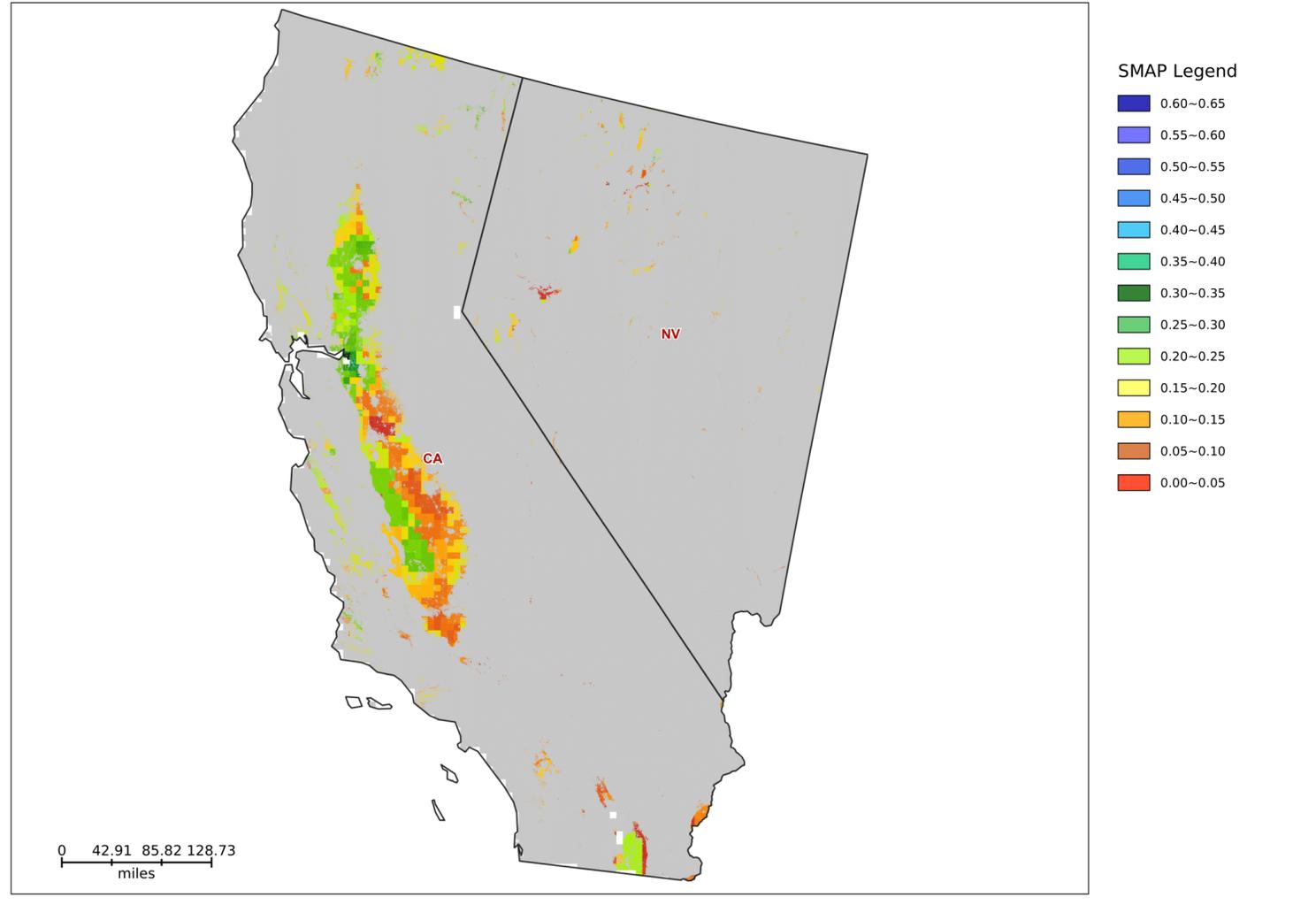
Pacific Region
 Sub Soil Moisture 9km
 July 5-11, 2021



Pacific Sub SM 9km Jul 5-11, 2021



Sub Soil Moisture (9km, July 5-11, 2021)			
Volumetric Soil Moisture (cm ³ /cm ³)	Pacific Region	California	Nevada
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
0.0-0.05	8.63%	8.26%	17.25%
0.05-0.1	20.63%	20.72%	17.64%
0.1-0.15	17.98%	17.37%	32.37%
0.15-0.2	21.58%	21.44%	24.68%
0.2-0.25	28.43%	29.36%	7.50%
0.25-0.3	2.34%	2.42%	0.57%
0.3-0.35	0.41%	0.43%	0.00%
0.35-0.4	0.00%	0.00%	0.00%
0.4-0.45	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%



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Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>

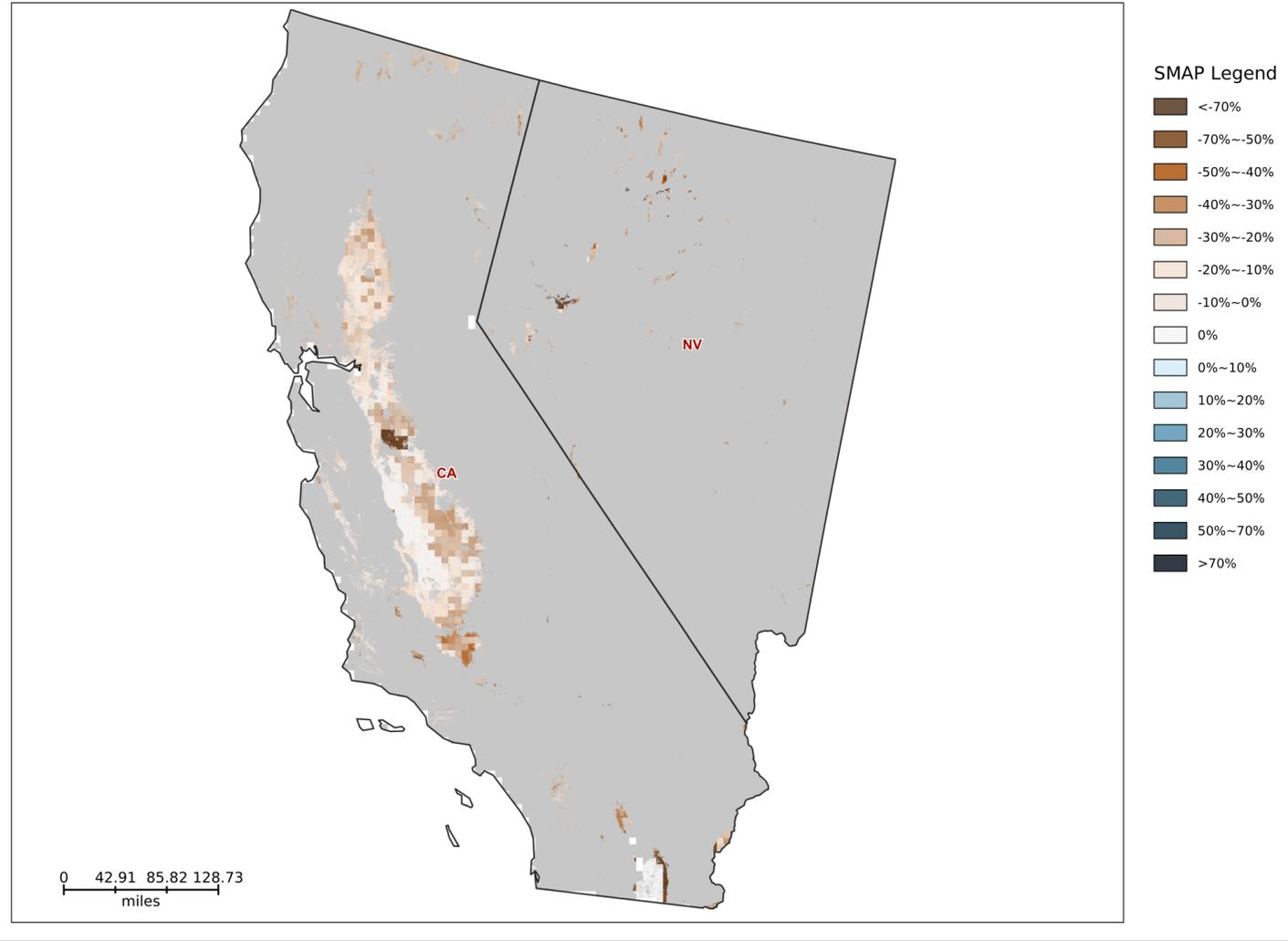


Pacific Region
 Sub Soil Moisture Anomaly 9km
 July 5-11, 2021

Sub Soil Moisture Anomaly (9km, July 5-11, 2021)			
Soil Moisture Anomaly	Pacific Region	California	Nevada
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
<-70%	0.18%	0.00%	4.47%
-70%~-50%	2.85%	2.56%	9.51%
-50%~-40%	0.47%	0.14%	7.93%
-40%~-30%	2.43%	1.93%	13.78%
-30%~-20%	12.76%	12.59%	16.43%
-20%~-10%	37.65%	37.45%	43.03%
-10%~0%	41.54%	43.13%	4.85%
0%~-10%	2.12%	2.21%	0.00%
10%~20%	0.00%	0.00%	0.00%
20%~30%	0.00%	0.00%	0.00%
30%~40%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%



Pacific Sub SM Anomaly 9km Jul 5-11, 2021



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Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>

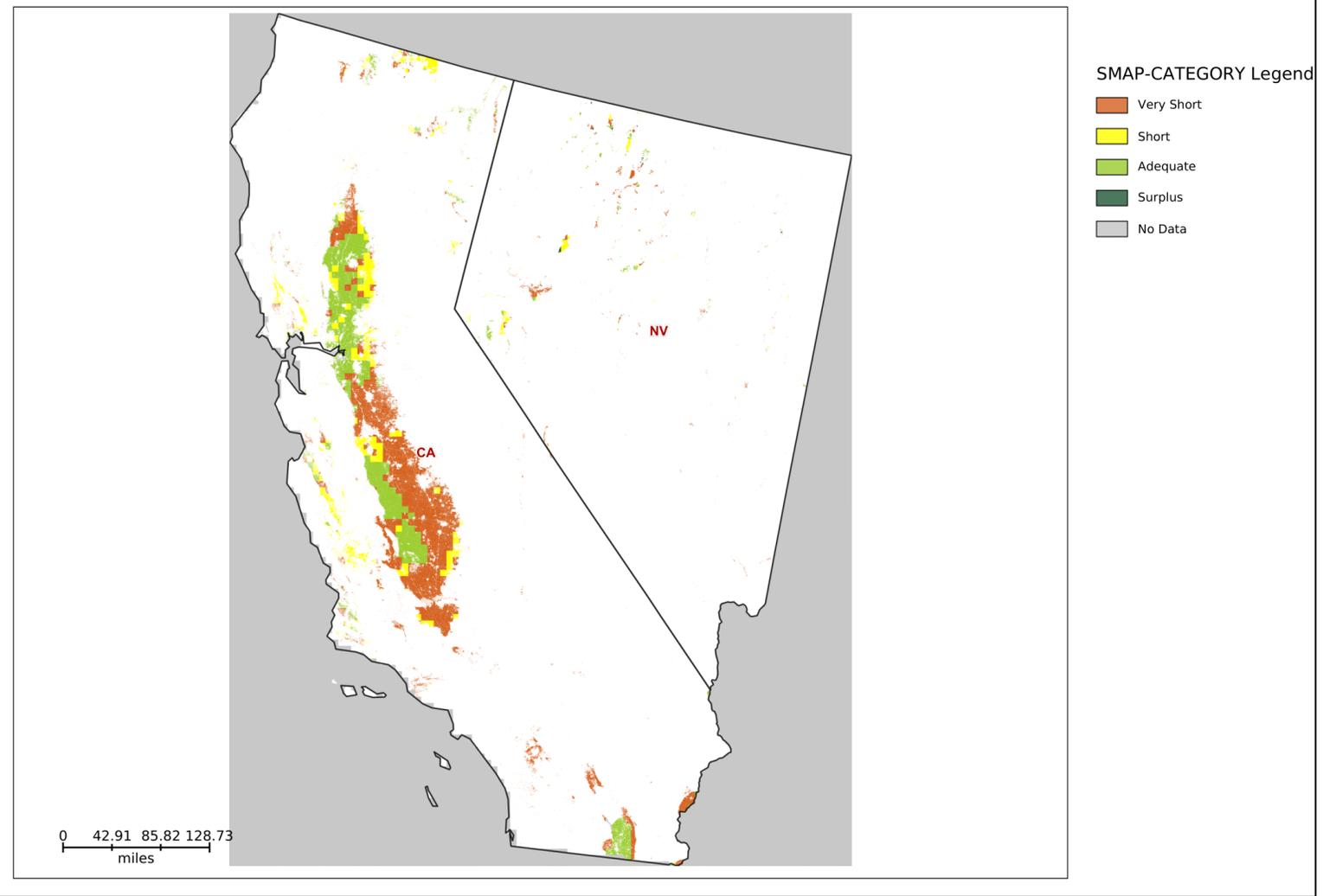


Pacific Region
 Sub Soil Moisture Categorical 9km
 July 5-11, 2021

Sub Soil Moisture Categorical (9km, July 5-11, 2021)			
Categorical Soil Moisture	Pacific Region	California	Nevada
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
Very Short	51.39%	51.69%	43.94%
Short	16.01%	15.59%	25.83%
Adequate	31.97%	32.24%	25.85%
Surplus	0.18%	0.01%	4.38%
No Data	0.45%	0.47%	0.00%
Total	100.00%	100.00%	100.00%



Pacific Sub SM Category 9km Jul 5-11, 2021



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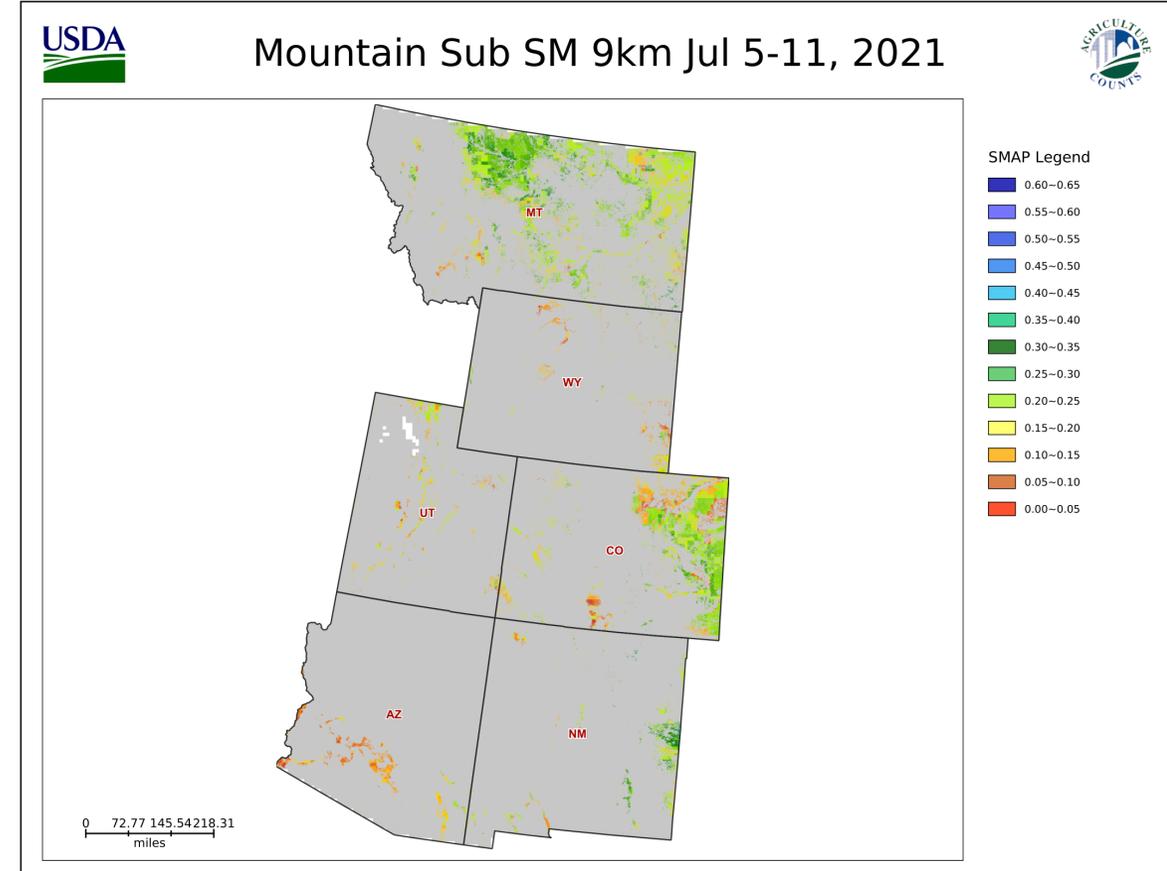


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Mountain Region Sub Soil Moisture 9km July 5-11, 2021

Sub Soil Moisture (9km, July 5-11, 2021)							
Volumetric Soil Moisture (cm3/cm3)	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland						
0.0-0.05	1.45%	6.03%	2.11%	0.08%	0.04%	3.10%	6.88%
0.05-0.1	6.56%	39.75%	7.11%	1.24%	7.66%	10.77%	16.40%
0.1-0.15	12.89%	34.76%	17.87%	4.95%	5.70%	32.05%	30.71%
0.15-0.2	27.45%	15.72%	19.23%	32.30%	22.35%	42.68%	31.03%
0.2-0.25	37.97%	3.73%	46.33%	42.43%	32.45%	11.35%	11.60%
0.25-0.3	13.20%	0.00%	7.32%	18.59%	27.74%	0.05%	3.00%
0.3-0.35	0.48%	0.00%	0.04%	0.42%	4.06%	0.00%	0.37%
0.35-0.4	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.4-0.45	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%						

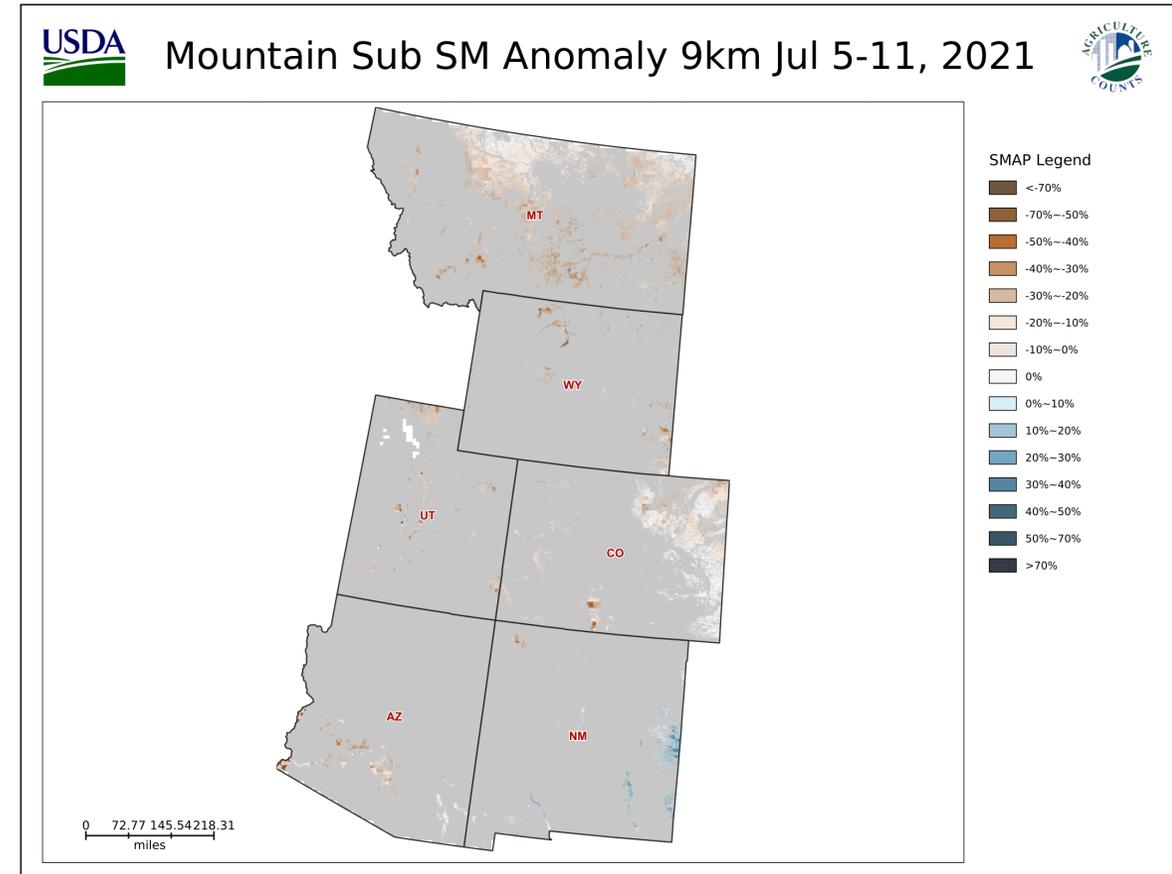


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Mountain Region Sub Soil Moisture Anomaly 9km July 5-11, 2021

Sub Soil Moisture Anomaly (9km, July 5-11, 2021)							
Soil Moisture Anomaly	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland						
<-70%	0.04%	0.00%	0.00%	0.05%	0.00%	0.40%	0.00%
-70%~-50%	0.20%	0.74%	0.04%	0.04%	0.01%	0.68%	2.29%
-50%~-40%	0.57%	2.94%	0.15%	0.20%	0.02%	2.44%	3.21%
-40%~-30%	1.52%	0.99%	0.99%	0.99%	0.97%	4.51%	9.37%
-30%~-20%	10.50%	20.76%	1.61%	13.33%	2.29%	20.22%	26.32%
-20%~-10%	37.54%	36.62%	18.52%	49.18%	2.87%	68.08%	47.55%
-10%~0%	37.86%	34.97%	58.88%	35.56%	5.07%	3.60%	9.99%
0%~-10%	7.43%	2.99%	19.06%	0.66%	20.84%	0.07%	1.27%
10%~20%	2.66%	0.00%	0.77%	0.00%	40.23%	0.00%	0.01%
20%~30%	1.22%	0.00%	0.00%	0.00%	20.09%	0.00%	0.00%
30%~40%	0.45%	0.00%	0.00%	0.00%	7.61%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%						



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>

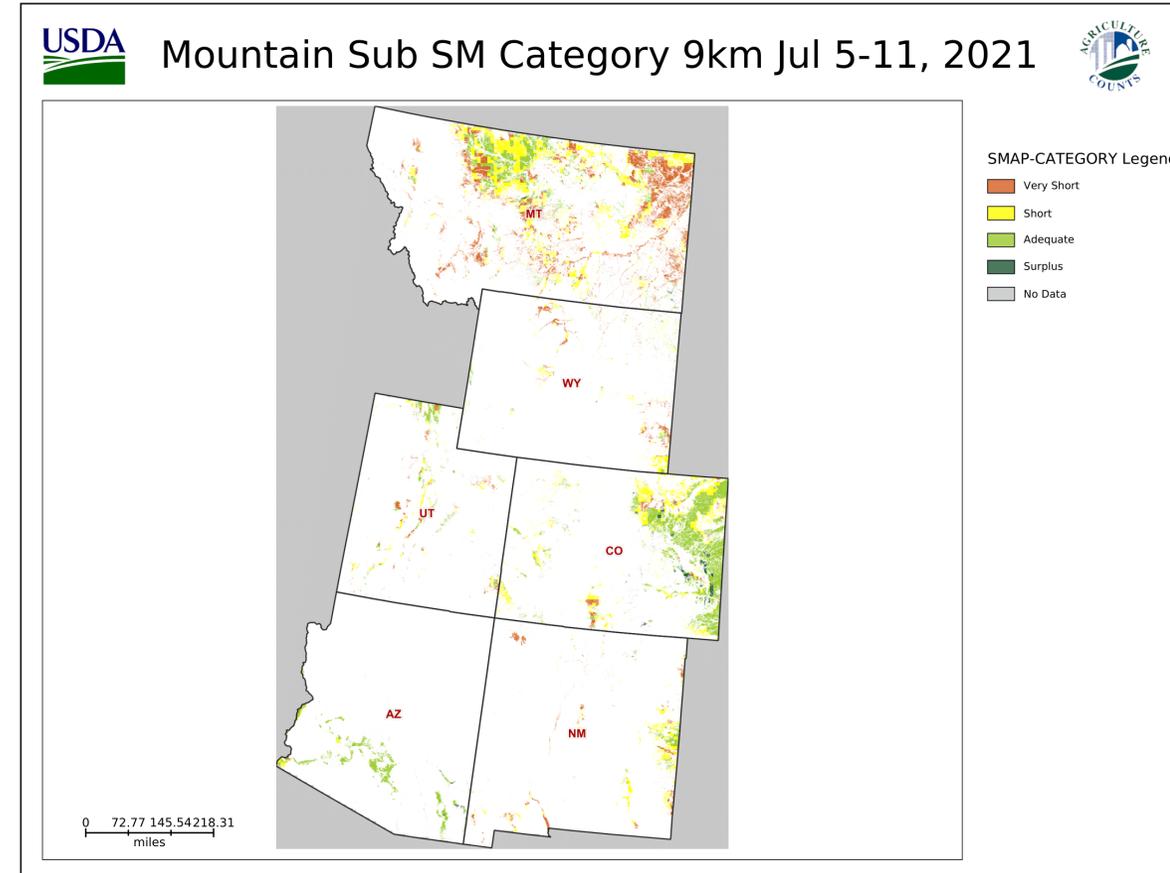


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Mountain Region
 Sub Soil Moisture Categorical 9km
 July 5-11, 2021

Sub Soil Moisture Categorical (9km, July 5-11, 2021)							
Categorical Soil Moisture	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland						
Very Short	26.73%	0.50%	4.27%	41.16%	31.01%	27.16%	37.07%
Short	34.23%	5.55%	28.87%	37.68%	51.91%	32.60%	43.52%
Adequate	36.63%	91.55%	62.76%	19.18%	16.86%	39.38%	18.56%
Surplus	1.61%	2.37%	4.11%	0.38%	0.21%	0.80%	0.86%
No Data	0.80%	0.02%	0.00%	1.59%	0.01%	0.06%	0.00%
Total	100.00%						



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Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



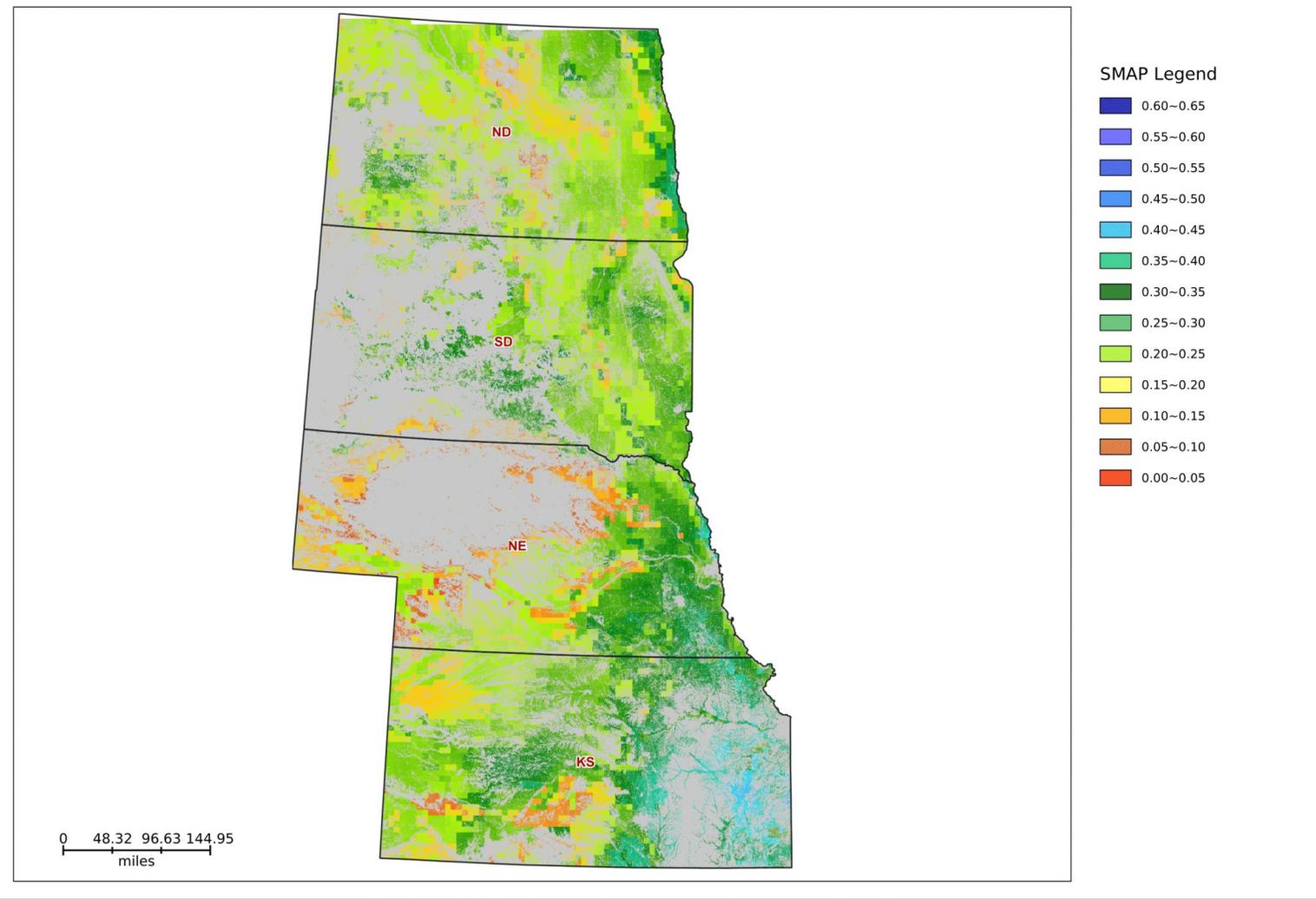
Northern Plains Region
 Sub Soil Moisture 9km
 July 5-11, 2021



N.Plains Sub SM 9km Jul 5-11, 2021



Sub Soil Moisture (9km, July 5-11, 2021)					
Volumetric Soil Moisture (cm ³ /cm ³)	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland				
0.0-0.05	0.31%	0.00%	1.32%	0.00%	0.03%
0.05-0.1	3.61%	3.47%	10.24%	0.70%	0.33%
0.1-0.15	5.44%	3.46%	10.60%	3.81%	4.59%
0.15-0.2	19.84%	13.40%	15.65%	35.25%	12.65%
0.2-0.25	37.02%	32.42%	21.19%	45.96%	49.25%
0.25-0.3	23.55%	24.46%	30.74%	10.68%	31.83%
0.3-0.35	8.09%	15.76%	9.78%	3.60%	1.31%
0.35-0.4	1.57%	5.05%	0.48%	0.00%	0.00%
0.4-0.45	0.57%	1.98%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



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Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



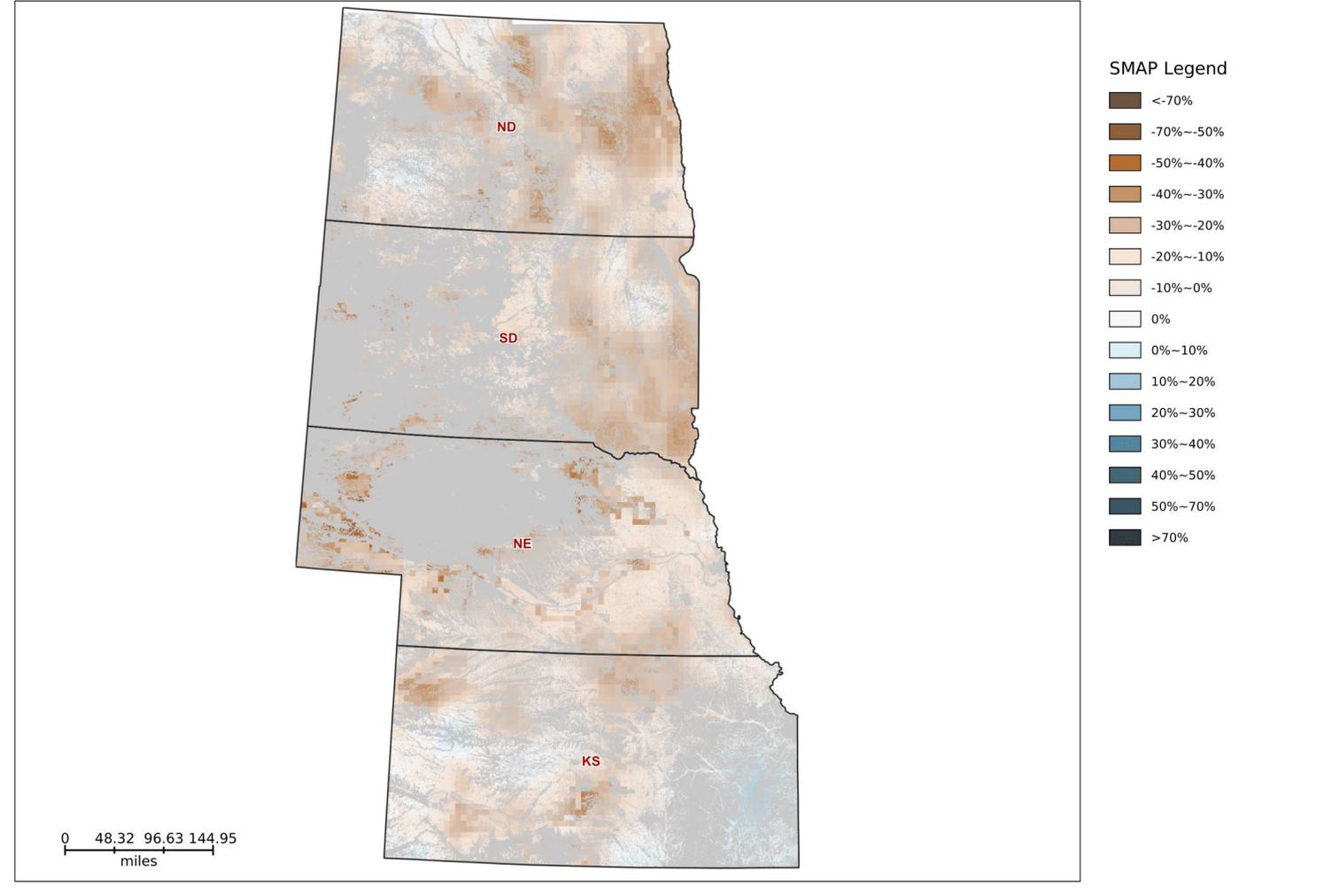
Northern Plains Region
 Sub Soil Moisture Anomaly 9km
 July 5-11, 2021



N.Plains Sub SM Anomaly 9km Jul 5-11, 2021



Sub Soil Moisture Anomaly (9km, July 5-11, 2021)					
Soil Moisture Anomaly	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland				
<-70%	0.00%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.00%	0.00%	0.00%	0.00%	0.00%
-50%~-40%	0.13%	0.00%	0.51%	0.00%	0.05%
-40%~-30%	0.40%	0.00%	1.46%	0.12%	0.17%
-30%~-20%	7.58%	2.66%	8.81%	10.62%	9.22%
-20%~-10%	50.91%	34.53%	50.05%	56.20%	67.91%
-10%~0%	35.56%	46.86%	39.17%	30.82%	21.76%
0%~-10%	4.83%	13.92%	0.00%	2.24%	0.89%
10%~20%	0.58%	2.02%	0.00%	0.00%	0.00%
20%~30%	0.00%	0.00%	0.00%	0.00%	0.00%
30%~40%	0.00%	0.00%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



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Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



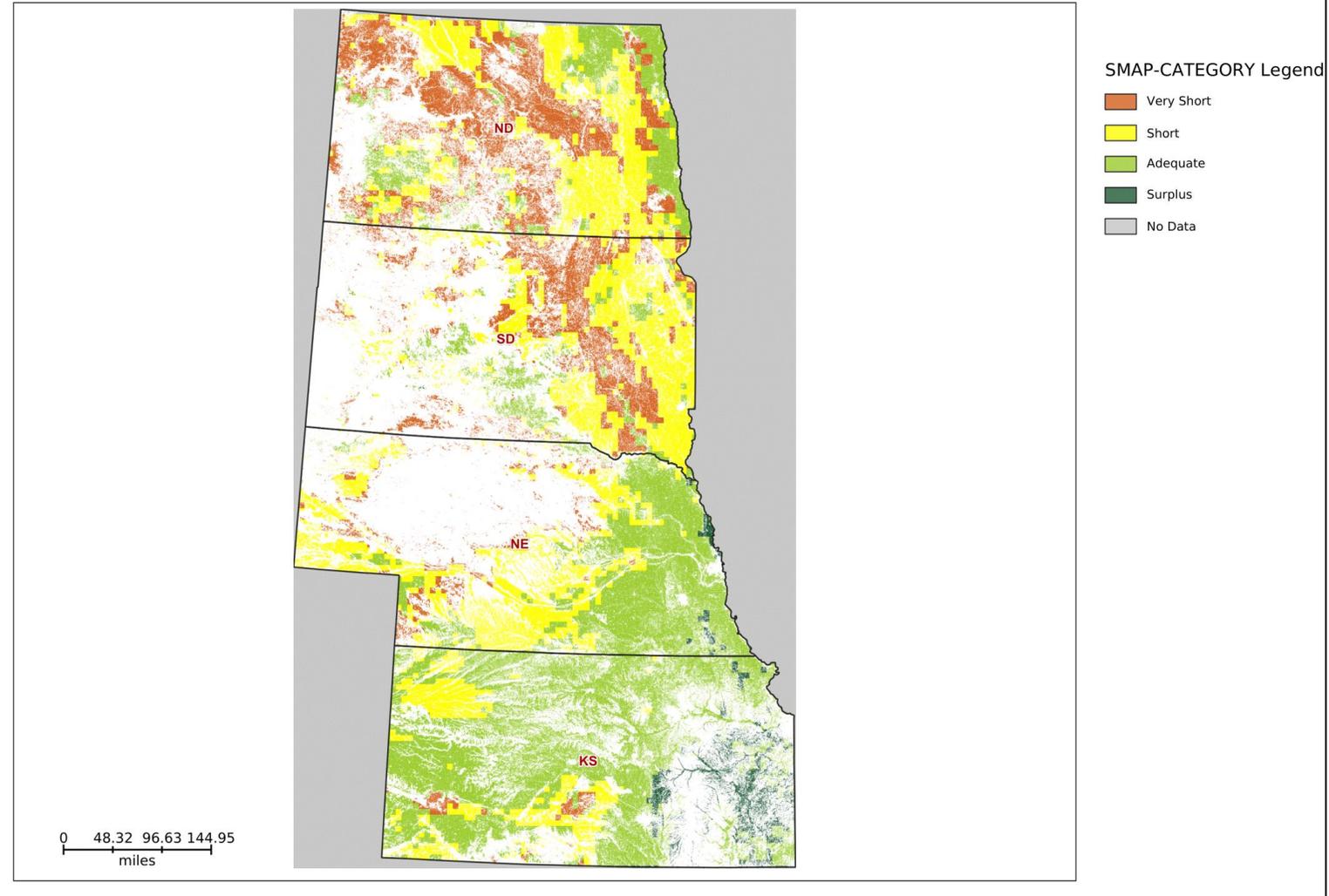
Northern Plains Region
 Sub Soil Moisture Categorical 9km
 July 5-11, 2021



N.Plains Sub SM Category 9km Jul 5-11, 2021



Sub Soil Moisture Categorical (9km, July 5-11, 2021)					
Categorical Soil Moisture	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland				
Very Short	20.35%	1.95%	6.36%	40.60%	34.84%
Short	33.75%	15.42%	37.19%	36.50%	52.60%
Adequate	43.24%	75.49%	55.09%	21.91%	12.52%
Surplus	2.38%	7.14%	1.35%	0.00%	0.03%
No Data	0.28%	0.00%	0.00%	0.99%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>

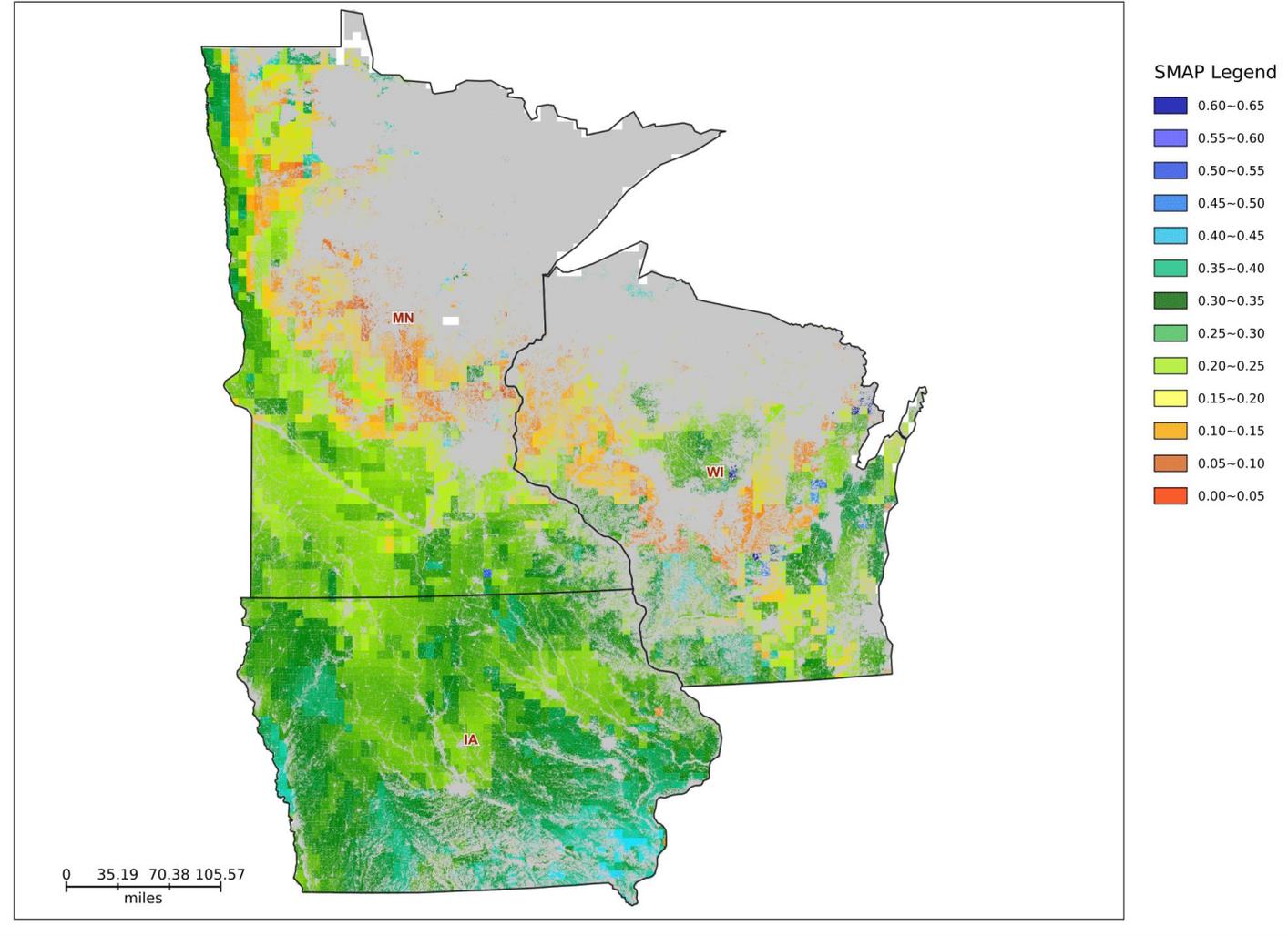


Upper Midwest Region
Sub Soil Moisture 9km
July 5-11, 2021

Sub Soil Moisture (9km, July 5-11, 2021)				
Volumetric Soil Moisture (cm ³ /cm ³)	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland			
0.0-0.05	0.16%	0.00%	0.39%	0.04%
0.05-0.1	3.29%	0.05%	4.84%	8.43%
0.1-0.15	5.62%	0.00%	9.53%	11.83%
0.15-0.2	8.11%	0.00%	13.81%	16.93%
0.2-0.25	29.82%	20.00%	45.60%	20.17%
0.25-0.3	32.68%	45.08%	20.18%	27.64%
0.3-0.35	17.43%	30.24%	4.90%	11.81%
0.35-0.4	2.25%	4.04%	0.53%	1.45%
0.4-0.45	0.33%	0.59%	0.12%	0.09%
0.45-0.5	0.11%	0.00%	0.09%	0.45%
0.5-0.55	0.10%	0.00%	0.00%	0.57%
0.55-0.6	0.02%	0.00%	0.00%	0.12%
0.6-0.65	0.06%	0.00%	0.00%	0.33%
> 0.65	0.03%	0.00%	0.00%	0.15%
Total	100.00%	100.00%	100.00%	100.00%



U.Midwest Sub SM 9km Jul 5-11, 2021



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



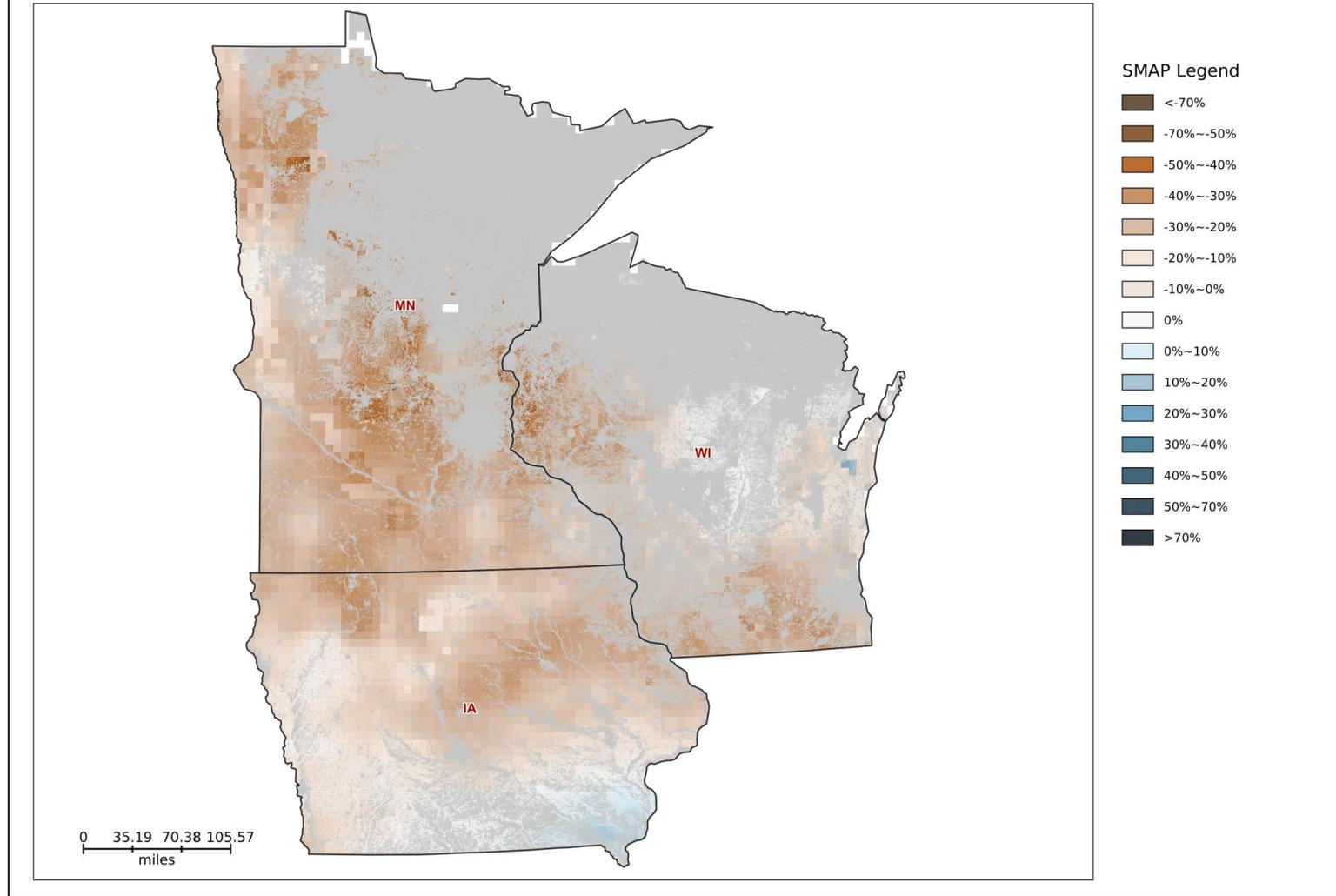
Upper Midwest Region
 Sub Soil Moisture Anomaly 9km
 July 5-11, 2021



U.Midwest Sub SM Anomaly 9km Jul 5-11, 2021



Sub Soil Moisture Anomaly (9km, July 5-11, 2021)				
Soil Moisture Anomaly	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland			
<-70%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.00%	0.00%	0.00%	0.00%
-50%~-40%	0.24%	0.00%	0.51%	0.27%
-40%~-30%	2.32%	0.00%	4.45%	3.73%
-30%~-20%	28.04%	13.34%	44.79%	29.26%
-20%~-10%	47.25%	51.25%	46.53%	38.11%
-10%~0%	18.94%	29.05%	3.72%	26.48%
0%~-10%	2.48%	4.86%	0.00%	1.78%
10%~20%	0.67%	1.49%	0.00%	0.00%
20%~30%	0.06%	0.00%	0.00%	0.38%
30%~40%	0.00%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



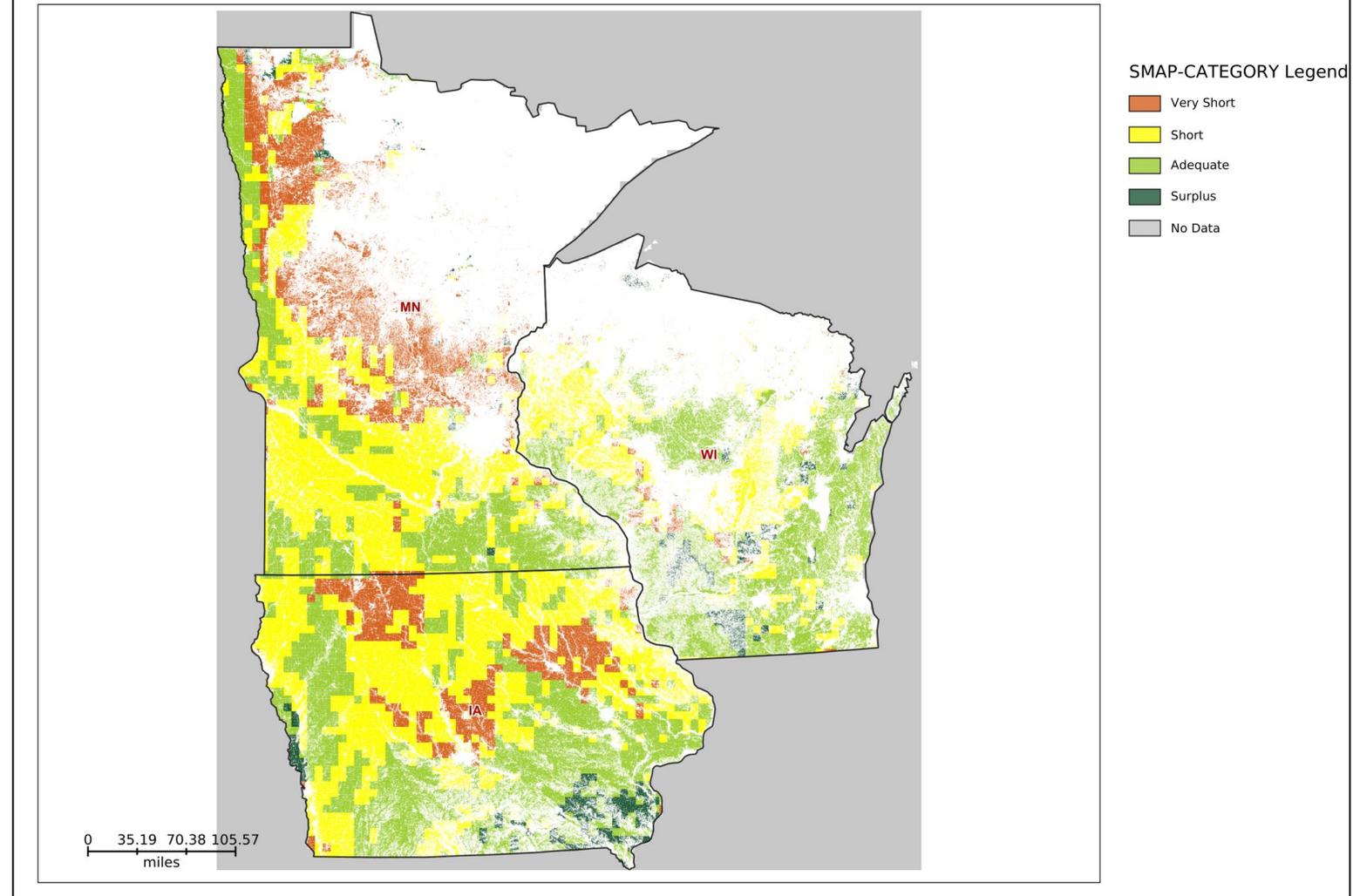
Upper Midwest Region
Sub Soil Moisture Categorical 9km
July 5-11, 2021



U.Midwest Sub SM Category 9km Jul 5-11, 2021



Sub Soil Moisture Categorical (9km, July 5-11, 2021)				
Categorical Soil Moisture	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland			
Very Short	15.48%	14.20%	23.09%	1.92%
Short	42.24%	44.91%	45.66%	27.91%
Adequate	39.45%	37.14%	30.47%	65.18%
Surplus	2.75%	3.75%	0.72%	4.69%
No Data	0.08%	0.00%	0.07%	0.31%
Total	100.00%	100.00%	100.00%	100.00%



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Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>

